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Practitioner's Docket No. 200-007950-US (PAR)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application  
Assistant Commissioner for Patents  
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Conway Robert SHAW Sean PRIOR  
Guy Arthur DURHAM Elie Abi CHAYA  
Nigel David TOUT Guy Alexander HOOKER  
Arnold GOCOOL

WARNING: Patent must be applied for in the name(s) of all of the actual inventor(s). 37 CFR 1.41(a) and 1.53(b).

For (title): PORTABLE RADIO TELEPHONE

CERTIFICATION UNDER 37 C.F.R. 1.10\*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date May 7, 1998, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL067094557US addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

\_\_\_\_\_  
Shauna Murphy

(type or print name of person mailing paper)

\_\_\_\_\_  
*shaunamurphy*  
Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8, cannot be used to obtain a date of mailing or transmission for this correspondence.

\*WARNING: Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will not be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

## 1. Type of Application

This new application is for a(n)

(check one applicable item below)

- Original (nonprovisional)
- Design
- Plant

**WARNING:** Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

**WARNING:** Do not use this transmittal for the filing of a provisional application.

**NOTE:** If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.

- Divisional.
- Continuation.
- Continuation-in-part (C-I-P).

## 2. Benefit of Prior U.S. Application(s) (35 U.S.C. 119(e), 120, or 121)

**NOTE:** If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

**WARNING:** If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U.S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

**WARNING:** When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application must be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).

- The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

## 3. Papers Enclosed That Are Required for Filing Date under 37 C.F.R. 1.53(b) (Regular) or 37 C.F.R. 1.153 (Design) Application

10 Pages of specification

2 Pages of claims

1 Pages of Abstract

11 Sheets of drawing

- formal
- informal

**WARNING:** DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. Comments on proposed new 37 CFR 1.84. Notice of March 9, 1988 (1990 O.G. 57-62).

**NOTE:** "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page." 37 C.F.R. 1.84(c).

(complete the following, if applicable)

The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. 1.84(b).

**4. Additional papers enclosed**

Preliminary Amendment  
 Information Disclosure Statement (37 C.F.R. 1.98)  
 Form PTO-1449 (PTO/SB/08A and 08B)  
 Citations  
 Declaration of Biological Deposit  
 Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.  
 Authorization of Attorney(s) to Accept and Follow Instructions from Representative  
 Special Comments  
 Other

**5. Declaration or oath**

Enclosed  
Executed by

(check all applicable boxes)

inventor(s).  
 legal representative of inventor(s).  
37 CFR 1.42 or 1.43.  
 joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.  
 This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.

Not Enclosed.

**WARNING:** Where the filing is a completion in the U.S. of an International Application, but where a declaration is not available, or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

Application is made by a person authorized under 37 C.F.R. 1.41(c) on behalf of all the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).

NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).

Showing that the filing is authorized.

(not required unless called into question. 37 CFR 1.41(d))

#### 6. Inventorship Statement

WARNING: If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

The same.

or

Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,  
 is submitted.  
 will be submitted.

#### 7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of \$130.00 required by 37 CFR 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 CFR 1.52(d).

NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).

English  
 Non-English

The attached translation is a verified translation. 37 C.F.R. 1.52(d).

#### 8. Assignment

An assignment of the invention to Nokia Mobile Phones Limited

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is attached. A separate  "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or  FORM PTO 1595 is also attached.  
 will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters-one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

**9. Certified Copy**

Certified copy(ies) of application(s)

Country United Kingdom	Appln. No. 9709468.4	Filed 9 May 1997
Country	Appln. No.	Filed
Country	Appln. No.	Filed

from which priority is claimed

is (are) attached.  
 will follow.

*NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.*

*NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.*

**10. Fee Calculation (37 C.F.R. 1.16)****A.  Regular application**

CLAIMS AS FILED				
Number filed	Number Extra	Rate	Basic Fee	37 C.F.R. 1.16(a) \$790.00
Total				
Claims (37 CFR 1.16(c)) 17 - 20 =	0	X	\$ 22.00	
Independent				
Claims (37 CFR 1.16(b)) 1 - 3 =	0	X	\$ 82.00	
Multiple dependent claim(s), if any (37 CFR 1.16(d))		+	\$270.00	

Amendment cancelling extra claims is enclosed.  
 Amendment deleting multiple-dependencies is enclosed.  
 Fee for extra claims is not being paid at this time.

*NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).*

Filing Fee Calculation

\$ 790.00

B.  Design application  
(\$330.00—37 CFR 1.16(f))  
Filing Fee Calculation \$ \_\_\_\_\_

C.  Plant application  
(\$540.00—37 CFR 1.16(g))  
Filing fee calculation \$ \_\_\_\_\_

11. Small Entity Statement(s)

Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.

**WARNING:** "Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. A nonprovisional application claiming benefit under 35 U.S.C. 119(e), 120, 121 or 365(c) of a prior application may rely on a verified statement filed in the prior application if the nonprovisional application includes a reference to a verified statement in the prior application or includes a copy of the verified statement filed in the prior application if status as a small entity is still proper and desired." 37 C.F.R. § 1.28(a).

(complete the following, if applicable)

Status as a small entity was claimed in prior application \_\_\_\_\_ / \_\_\_\_\_, filed on \_\_\_\_\_, from which benefit is being claimed for this application under:  
35 U.S.C.  119(e),  
 120,  
 121,  
 365(c),

and which status as a small entity is still proper and desired.

A copy of the verified statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

\$ \_\_\_\_\_

**NOTE:** Any excess of the full fee paid will be refunded if a verified statement and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 CFR 1.28(a).

12. Request for International-Type Search (37 C.F.R. 1.104(d))

(complete, if applicable)

Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

**13. Fee Payment Being Made at This Time**

Not Enclosed  
 No filing fee is to be paid at this time.  
(This and the surcharge required by 37 C.F.R. 1.16(e) can be paid subsequently.)

Enclosed

Filing fee \$ 790.00

Recording assignment (\$40.00; 37 C.F.R. 1.21(h))  
(See attached "COVER SHEET FOR ASSIGNMENT ACCOMPANYING NEW APPLICATION".) \$ \_\_\_\_\_

Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached (\$130.00; 37 C.F.R. 1.47 and 1.17(h)) \$ \_\_\_\_\_

For processing an application with a specification in a non-English language (\$130.00; 37 C.F.R. 1.52(d) and 1.17(k)) \$ \_\_\_\_\_

Processing and retention fee (\$130.00; 37 C.F.R. 1.53(d) and 1.21(l)) \$ \_\_\_\_\_

Fee for international-type search report (\$40.00; 37 C.F.R. 1.21(e)) \$ \_\_\_\_\_

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 CFR 1.53(d) and this, as well as the changes to 37 CFR 1.53 and 1.78, indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(d).

Total fees enclosed \$ 790.00

**14. Method of Payment of Fees**

Check in the amount of \$ 790.00

Charge Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

## 15. Authorization to Charge Additional Fees

WARNING: If no fees are to be paid on filing, the following items should not be completed.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 16-1350:

37 C.F.R. 1.16(a), (f) or (g) (filing fees)

37 C.F.R. 1.16(b), (c) and (d) (presentation of extra claims)

NOTE. Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

37 C.F.R. 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

37 C.F.R. 1.17 (application processing fees)

WARNING: While 37 CFR 1.17(a), (b), (c) and (d) deal with extensions of time under § 1.136(a), this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 C.F.R. 1.136(a) is to no avail unless a request or petition for extension is filed." (Emphasis added). Notice of November 5, 1985 (1060 O.G. 27).

37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE. Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

NOTE: 37 CFR 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee." From the wording of 37 CFR 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

## 16. Instructions as to Overpayment

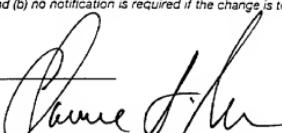
Credit Account No. 16-1350

Refund

Reg. No. 24,622

Tel. No. (203) 259-1800

Customer No.



Clarence A. Green

SIGNATURE OF PRACTITIONER

Clarence A. Green

(type or print name of attorney)

PERMAN & GREEN, LLP

P.O. Address

425 Post Road, Fairfield, CT 06430

**Incorporation by reference of added pages**

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added \_\_\_\_\_

Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added \_\_\_\_\_

Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added \_\_\_\_\_

Statement Where No Further Pages Added

*(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)*

This transmittal ends with this page.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Express Mail No. EL067094557US

In re Application of: SHAW et al.

SERIAL NUMBER:

EXAMINER:

FILING DATE: Herewith

ART UNIT:

TITLE: PORTABLE RADIO TELEPHONE

ATTORNEY DOCKET NO.: 200-007950-US(PAR)

The Commissioner of Patents and Trademarks

Washington, D.C. 20231

**PRELIMINARY AMENDMENT**

Dear Sir:

Please amend the above-identified, enclosed patent application as follows:

**IN THE CLAIMS:**

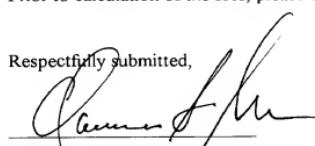
Please amend Claim 4 as shown below.

Claim 4, line 1, delete "or claim 3".

**REMARKS**

Prior to calculation of the fees, please enter this preliminary amendment.

Respectfully submitted,



Clarence A. Green, Reg. No. 24,622  
PERMAN & GREEN, LLP  
425 Post Road  
Fairfield, CT 06430  
(203) 259-1800

5-6-96

Date

## PORTABLE RADIO TELEPHONE

### Background of the Invention

5 The present invention relates to a portable radio telephone having a projecting antenna. The portable radio telephone may, for example, be a radio telephone such as a conventional handheld cellular telephone, or it may be a so-called smart radio telephone or personal organiser having radio frequency (RF) communication capabilities.

10 A handheld cellular telephone generally includes an antenna for transmitting and receiving radio frequency signals. Some handheld cellular telephones have antennas which are movable, for example, between retracted and extended positions

15 European patent publication EP 0 516 490 shows an example of a movable antenna for a portable cellular radio telephone, in the form of a whip antenna which may be extended out of the housing of the portable telephone, or retracted into the housing of the portable telephone.

20 The Ericsson EH97 handheld cellular telephone shows another example of a movable antenna. Here the movable antenna is in the form of a rod antenna joined to the side of the cellular telephone housing so that it may rotate through 360 degrees. The antenna can be rotated manually by a user between a retracted position and an extended position (see Figure 1).

### Summary of the Invention

According to the present invention there is provided a portable radio telephone having an antenna which can be pivoted between a first position in  
30 which it projects from a surface of the telephone, and a second position in which it projects from a surface of the telephone, whereby the antenna may only pivot in a single plane and through an acute angle.

A portable radio telephone in accordance with the invention may have an advantage that the antenna can be moved to a first position ideal for making voice calls and to a second position ideal for storing the telephone in a  
5 pocket or placing on a flat surface. Preferably, in this second position the profile of the radio telephone is minimised

The antenna of the portable radio telephone projects from a surface of the telephone housing in both the first position and the second position. Thus a  
10 user can easily pivot the antenna from the first position to the second position or vice versa

Having the antenna projecting from the surface of the telephone housing in both the first position and the second position may also improve performance  
15 of the antenna by providing a better radiation pattern compared to an antenna not projecting from a surface.

The antenna may be pivotable to one or more stable positions, preferably two stable positions. The antenna may also be biased towards and/or releasably  
20 locked in the stable positions.

Ideally in a first stable position the antenna is generally upright and in a second position the antenna is generally slanted, angled or canted relative to the main body of the telephone

25 A user of the telephone may have the antenna of the telephone in the upright position most of the time. However, when a call is received by the telephone the antenna may be manually or automatically pivoted to the angled position for the duration of the call. Equally when the user initiates a call the antenna  
30 may be manually or automatically pivoted to the angled position for the duration of the call

In a preferred embodiment the surface which the antenna projects from is an end surface of the telephone. Ideally the surface is a top surface of the telephone.

5 Preferably the antenna is a helical antenna which may be substantially axially symmetric

The shape of the antenna may be cylindrical, or it may be conical.

10 In a preferred embodiment the antenna is attached to the telephone by a hinge arrangement which ensures that the antenna only pivots through an acute angle and in a single plane

#### **Brief Description of the Drawings**

15 Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings, in which

20 Figure 1 is a side and front view of the Ericsson EH97 cellular telephone discussed in the introduction.

Figure 2 is a perspective view of a radio telephone in accordance with the invention with the antenna in an upright position,

25 Figure 3 is a perspective view of the radio telephone of Figure 2 with the antenna pivoted to an angled position.

Figure 4 is a view of a radio telephone in accordance with the invention in use, with the antenna pivoted to an angled position;

30 Figure 5a is a side view of a radio telephone in accordance with the invention with the antenna in an upright position

Figure 5b is a side view of the radio telephone of Figure 4a with the antenna pivoted to an angled position.

5    Figure 6 is a series of three partial views of a radio telephone in accordance with the invention showing the antenna in three different pivoted positions.

10    Figure 7 is another series of three partial views of a radio telephone in accordance with the invention, showing the antenna in three different pivoted positions.

15    Figure 8 is another series of three partial views of a radio telephone in accordance with the invention showing the antenna in three different pivoted positions.

20    Figure 9 is another series of three partial views of a radio telephone in accordance with the invention, showing the antenna in three different pivoted positions.

25    Figure 10 is a view of the radio telephone of Figure 4 which shows pivoting of the antenna by a thumb of a user.

Figure 11 is a side view of the radio telephone of Figure 4b when placed on a surface,

30    Figure 12 is cross-sectional view of a portion of a radio telephone in accordance with the invention with the antenna in the upright position;

35    Figure 13 is cross-sectional view of a portion of the radio telephone of Figure 12, with the antenna pivoted to an angled position;

Figure 14 is cross-sectional view of a portion of a radio telephone in accordance with the invention, with the antenna in the upright position,

Figure 15 is cross-sectional view of a portion of the radio telephone of Figure 14, with the antenna pivoted to an angled position;

5 Figure 16 is a perspective view of a telephone in accordance with the invention;

#### Detailed Description of the Invention

10 Referring to Figure 2, there is shown a portable radio telephone 1 consisting of a main body portion 12 and an antenna 13.

The main body portion 12 of the telephone comprises a generally rectangular housing having a front surface 16, a back surface 17, side surfaces 15, a bottom surface 18, and a top surface 14. The main body portion is generally elongate and accordingly defines a major axis, shown as A-A in Figure 2. The telephone is designed to be brought into operating proximity with the head of a user as shown in Figure 4 such that in general the front surface 16 faces the head of a user, the back surface 17 faces away from the head of the user, the bottom surface 18 faces downwards, and the top surface 14 faces upwards.

The main body portion 12 of the telephone 1 includes an earpiece 19 and a microphone 20 both situated on the front surface 16. The earpiece 19 and microphone 20 are positioned to cooperate respectively with the ear and mouth of a user as shown in Figure 4

The user interface of the telephone 1 further comprises a keypad including keys 21 for controlling the operation of the telephone, and a display 22 (e.g. an LCD display) for displaying information relevant to the operation of the telephone. Illuminating means (e.g. LED's) are provided to help a user see

the keypad and display in bad light conditions. These illuminating means may be switched on or off depending on the operational state of the telephone.

The antenna 13 of the telephone 1 projects from the top surface 14 such that

5 it extends beyond the housing of the main body portion 12. The antenna 13 is a helical antenna having a generally cylindrical shape with a rounded distal end. The antenna 13 defines a major axis about which the antenna is axially symmetric. The shape of the antenna may take other similarly symmetric forms such as a conical shape. These forms of antenna are often referred to

10 as stub antennas. In Figure 2 the major axis of the antenna is substantially parallel with the major axis of the main body portion and is normal and perpendicular to the top surface.

Referring to Figure 5a there is shown a side view of another telephone

15 sharing the same features as the telephone in Figure 2. The antenna 13 again projects from the top surface 14 such that it extends beyond the housing of the main body portion 12. In this embodiment the top surface is curved or rounded. As shown in Figure 4a, the major axis of the antenna is substantially parallel with the major axis of the main body portion and is again

20 normal to the top surface

In accordance with the invention the antenna 13 of the telephone may be pivoted from the upright position shown in Figures 2 and 5a, to an angled or canted position as shown in Figures 3 and 5b.

25 As shown in Figures 2 and 3 the antenna 13 may pivot about an axis B-B such that the major axis of the antenna is substantially perpendicular to axis B-B throughout the rotation of the antenna. Accordingly, the antenna rotates only in a single plane. This single plane is parallel with the side surfaces,

30 perpendicular to the top surface, and perpendicular to the front surface.

The pivotal rotation of the antenna is limited such that the antenna may only rotate through a small angle  $\phi$  between the upright position and the angled position as indicated by arrow C in Figures 3 and 5b. In this way the antenna always projects from the top surface of the telephone.

5

When the antenna is in the canted position the angle subtended by the major axis of the main body portion and the major axis of the antenna equals  $\phi$ . In the canted position the antenna is also directed or orientated away from front surface 16 as shown in Figures 3, 4, and 5b.

10

When the antenna is in the upright position and the telephone is brought into operating proximity with the head of a user, the radio frequency performance of the antenna is affected. This is due to the head of the user disturbing the radiation pattern normally produced by the antenna. By pivoting the antenna to the canted position while the telephone is in operating proximity with the head of a user, the antenna performance is improved. This is due to the antenna pivoting away from the head so that the head has less of a disturbing effect on the radiation pattern produced by the antenna.

15

Referring to Figures 6 to 9 there are shown four possible ways in which an antenna of a telephone in accordance with the present invention may be biased and/or locked as it pivots between the upright and canted positions. In each of the Figures 6 to 9 there are shown 3 views, namely a view of the antenna in the upright position, a view of the antenna in the partially canted position, and a view of the antenna in the fully canted position. Each arrow in the Figures 5 to 8 refers to the direction in which the antenna is biased. The biasing may be provided by, for example, a spring action.

20

Referring specifically to Figure 6, the antenna is neutrally biased in the partially canted position, and on either side of this position is biased towards the upright and fully canted positions. Accordingly, the antenna is stable in the upright and the fully canted positions.

Referring specifically to Figure 7, the antenna is releasably locked in the upright position, and once released is biased towards the fully canted position. Accordingly, the antenna is stable in the upright and the fully canted  
5 positions.

Referring specifically to Figure 8, the antenna is releasably locked in the fully canted position, and once released is biased towards the upright position. Accordingly, the antenna is stable in the upright and the fully canted  
10 positions.

Referring specifically to Figure 9, the antenna is always biased towards the fully canted position. Accordingly, the antenna is stable in the fully canted position

15 Referring now to Figure 10, there is shown the telephone of Figures 5a and 5b being operated by a hand of a user. With the fingers and palm of the hand gripping the main body portion 12, the thumb is free to pivot the antenna 13 from the upright position to the canted position. Thus the telephone allows  
20 one handed pivoting of the antenna to control the operation of the telephone. It is also possible to pivot the antenna with two hands

When storing the telephone of Figure 4a in a pocket, for example, it is desirable to have the antenna of the telephone in the upright position so that  
25 the profile of the telephone is minimised. Another instance when it is appropriate to have the antenna in the upright position is when placing the telephone on a flat surface. Sometimes, however, the antenna may be in the canted position when it is placed on a flat surface as shown in Figure 11. In this situation the telephone is likely to experience a downward force on its  
30 front surface 16, as indicated by the arrow labelled F. An advantage of the telephone in this situation is that the antenna may adopt the upright position as a consequence of the force F pivoting the antenna relative to the main

body portion Accordingly, the telephone is likely to wobble on the surface and also the antenna is less liable to break or snap as a result of the force F

Figures 12 and 13 are cross-sectional views of the telephone shown in Figures 2 and 3, showing a pivot arrangement for the antenna, and a switch responsive to pivotal movement of the antenna between the upright position and the canted position. The antenna 13 pivots about the pivot pin 25 only between the upright position shown in Figure 12 and the angled position shown in Figure 13. The pivotal rotation of the antenna is limited in this way by the stop pins 27 which abut the antenna to prevent further pivotal rotation at the extremes of the antenna's rotation. A switch 26 is provided in the housing of the main body portion 12 and is coupled to a microprocessor of the telephone to control the operation thereof. The switch 26 is actuated depending on whether a switch actuator 29 on the antenna 13 is in close proximity with the switch. In Figure 12 the antenna is in the upright position and the switch actuator 29 is not in close proximity with the switch, therefore the switch is not actuated. However, when the antenna is pivoted to the angled position as in Figure 13, the switch actuator 29 is in close proximity with the switch and the switch is actuated. The switch 26 may be a magnetic reed switch and the switch actuator 29 a magnet.

Figures 14 and 15 are cross-sectional views of the telephone shown in Figures 2 and 3 showing an alternative pivot arrangement for the antenna, and an alternative switch responsive to pivotal movement of the antenna between the upright position and the canted position. The antenna pivots in the same way as in Figures 12 and 13. However, the antenna 13 in this embodiment includes a camming surface 30 which abuts a sprung cam follower 28 in such a way as to produce the biasing action shown in Figure 6. The switch 26 is actuated in this embodiment as a result of a surface of the antenna 13 urging the switch closed. In Figure 14 the antenna is in the upright position and a surface of the antenna pushes the switch closed, therefore the switch is actuated. However, when the antenna is pivoted to the

angled position, the surface of the antenna does not urge the switch closed and the switch is not actuated. The switch may be a leaf switch.

Another embodiment in accordance with the invention is shown in Figure 16

- 5 In this embodiment the main body portion 12 is pen shaped and the antenna 13 extends beyond the housing of the main body portion. The main body portion also has a microphone 20 situated towards the bottom of the telephone and a loudspeaker 19 situated towards the top of the telephone
- 10 In view of the foregoing description it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention

The scope of the present disclosure includes any novel feature or combination of features disclosed therein either explicitly or implicitly or any

- 15 generalisation thereof irrespective of whether or not it relates to the claimed invention or mitigates any or all of the problems addressed by the present invention. The applicant hereby gives notice that new claims may be formulated to such features during prosecution of this application or of any such further application derived therefrom.

What is claimed is -

1. A portable radio telephone having an antenna which can be pivoted between a first position in which it projects from a surface of the telephone, and a second position in which it projects from a surface of the telephone.  
5 whereby the antenna may only pivot in a single plane and through an acute angle.
2. A portable radio telephone as claimed in claim 1, wherein the antenna is pivotable to a first stable position  
10
3. A portable radio telephone as claimed in claim 2, wherein the antenna is biased towards the first stable position.
4. A portable radio telephone as claimed in claim 2 or claim 3, wherein  
15 the antenna is releasably locked in the first stable position
5. A portable radio telephone as claimed in claim 2, wherein the antenna is pivotable to a second stable position  
20
6. A portable radio telephone as claimed in claim 5, wherein the antenna is biased towards the second stable position
7. A portable radio telephone as claimed in claim 5, wherein the antenna is releasably locked in the second stable position  
25
8. A portable radio telephone as claimed in claim 2, wherein in the first stable position the antenna projects substantially parallel with a major axis of the main body portion
- 30 9. A portable radio telephone as claimed in claim 2, wherein in the first stable position the antenna projects substantially perpendicular to the top surface of the main body portion

10. A portable radio telephone as claimed in claim 2, wherein the profile of the radio telephone is minimised when the antenna is in the first stable position

5 11. A portable radio telephone as claimed in claim 2, wherein in the first stable position the antenna is canted relative to a major axis of the main body portion

10 12. A portable radio telephone as claimed in claim 1, wherein the single plane of rotation intersects the top surface of the main body portion.

13. A portable radio telephone as claimed in claim 1, wherein the single plane of rotation is substantially perpendicular to a front surface of the radio telephone

15 14. A portable radio telephone as claimed in claim 1, wherein the antenna is a non-retracting helical antenna

20 15. A portable radio telephone as claimed in claim 1, wherein the main body portion includes an earpiece positioned near the antenna

16. A portable radio telephone as claimed in claim 1, wherein the main body portion includes a microphone positioned distant from the antenna

25 17. A portable radio telephone as claimed in claim 1, wherein the antenna extends beyond the main body portion.

ABSTRACT

A portable radio telephone having an antenna projecting from the top surface. The antenna can be pivoted from an upright position to an angled position.

5

Figure 3.

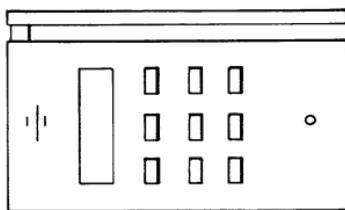


Fig.1.

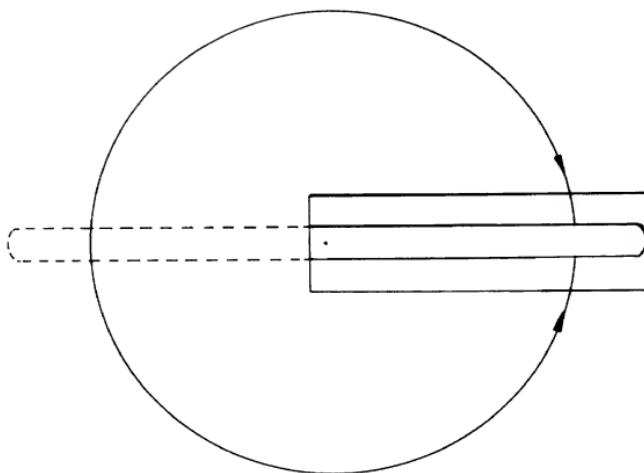


Fig.2. A

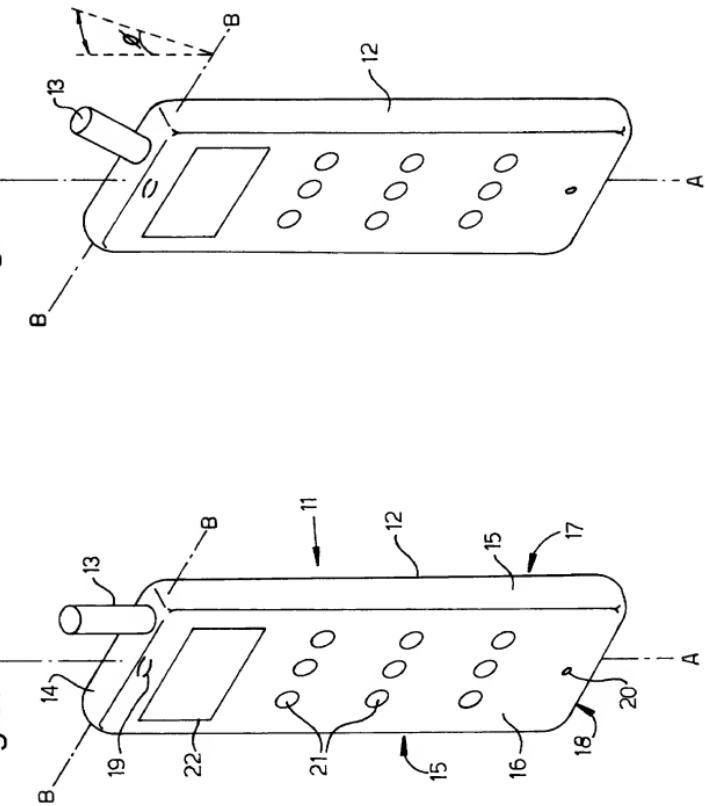


Fig.3. A

Fig.4.

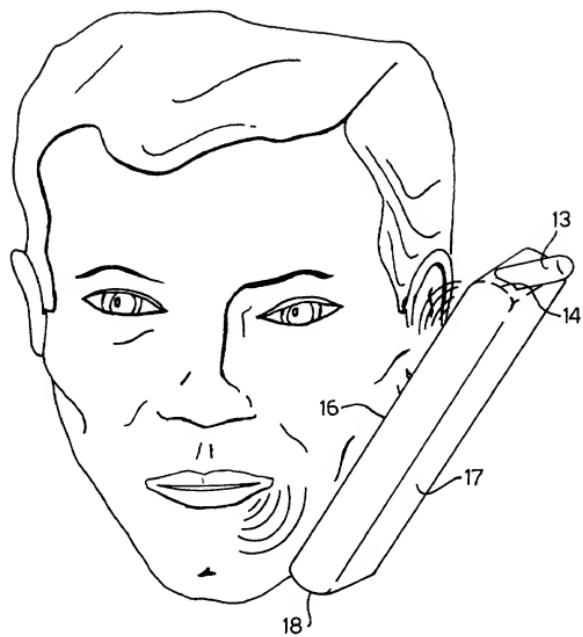


Fig.5a.

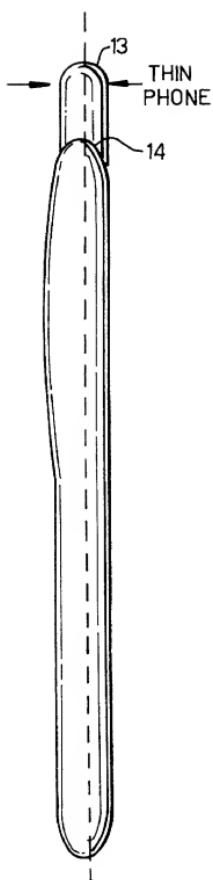


Fig.5b.

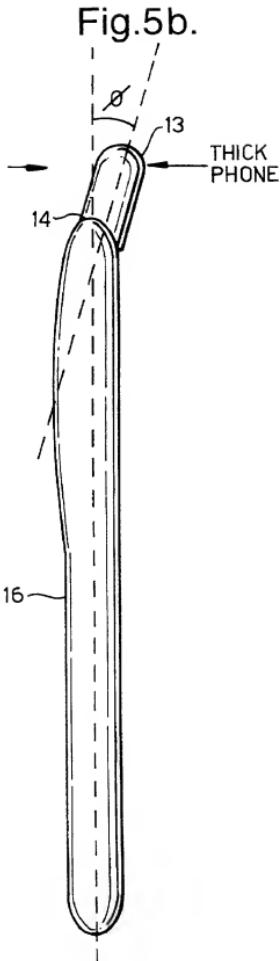


Fig.6.

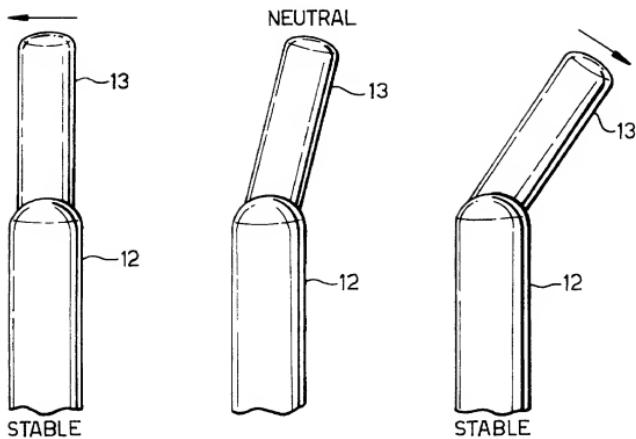


Fig.7.

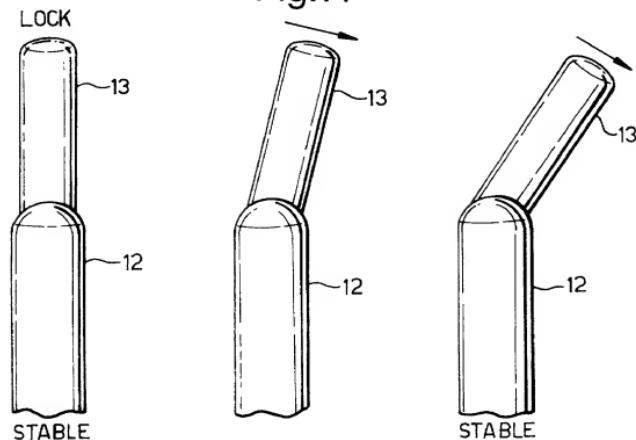


Fig.8.

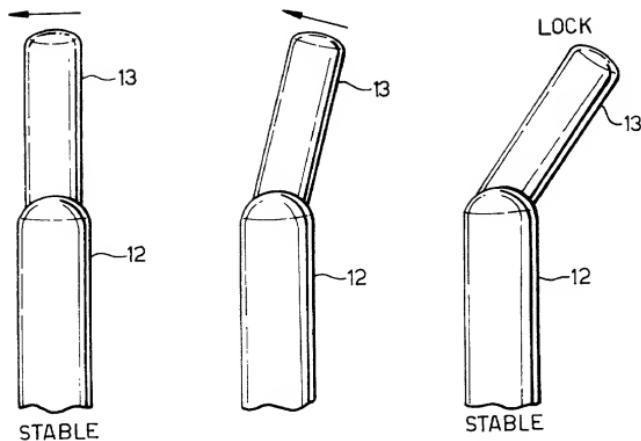


Fig.9.

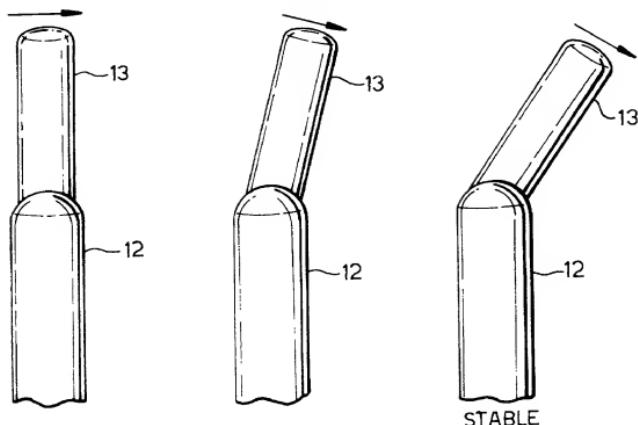


Fig. 10.

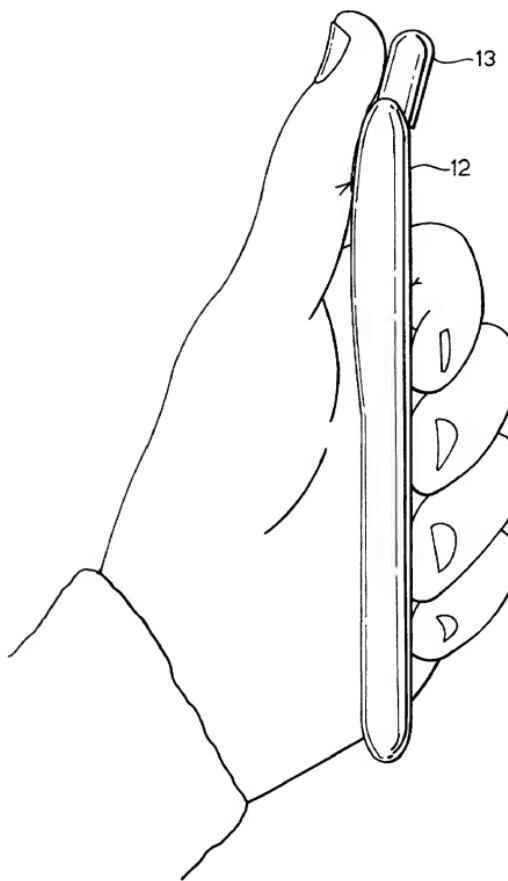


Fig. 11.

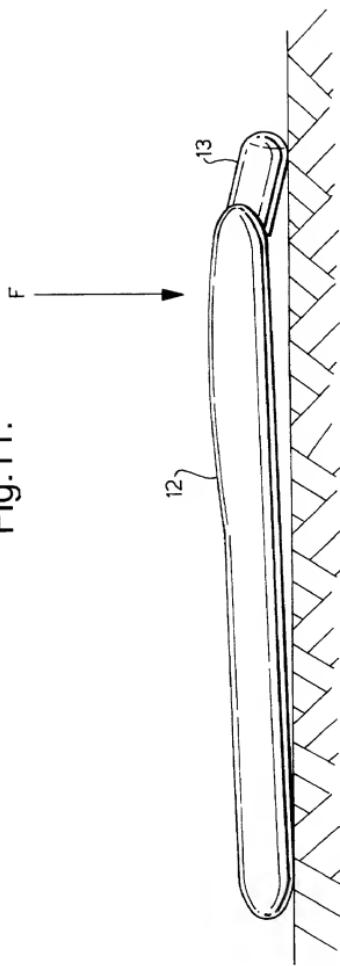


Fig.13.

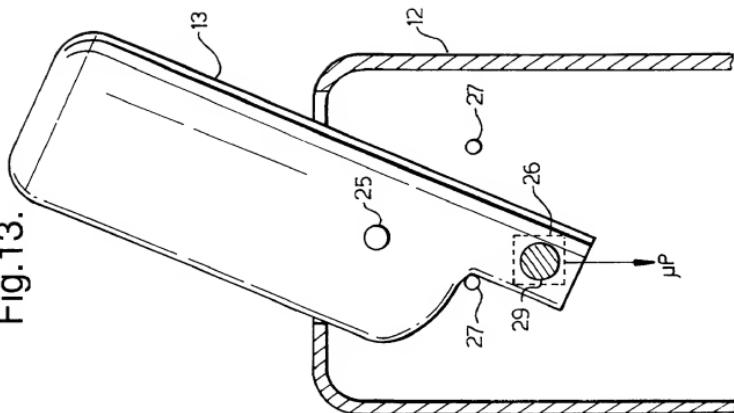


Fig.12.

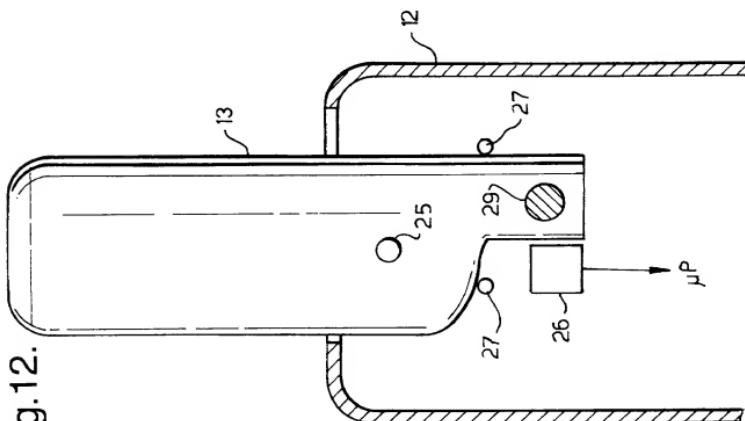


Fig.14.

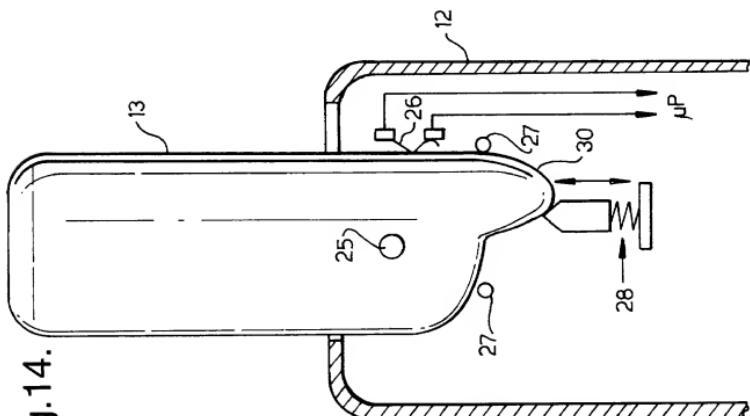


Fig.15.

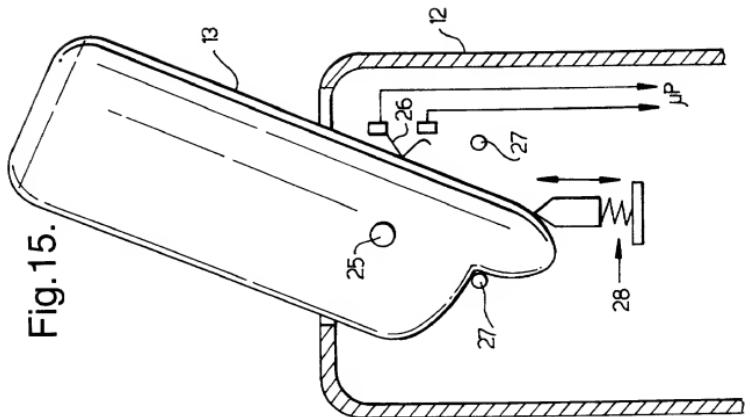
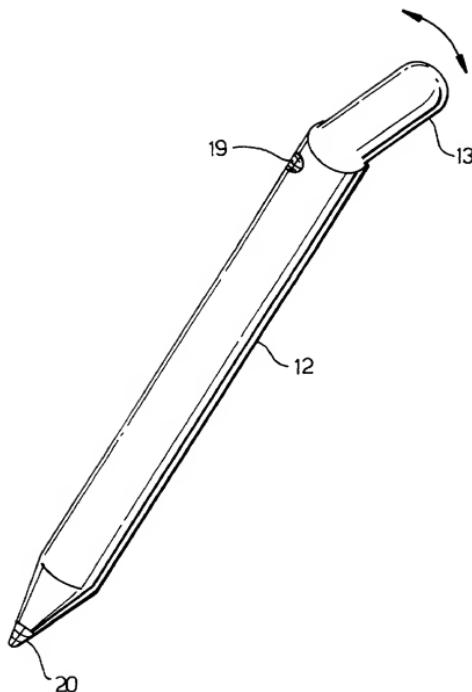
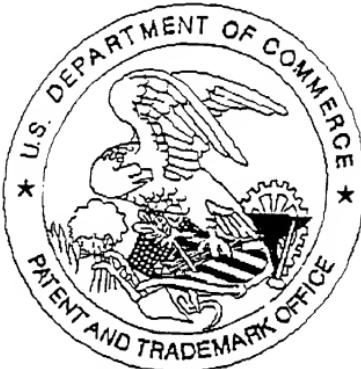


Fig. 16.



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